359/493

EASTMAN
POLA-SCREENS

WHAT YOU CAN DO WITH POLA-SCREENS

A. Pola-Screen (Type 1 or 1A) at the lens only. Exposure increase required: For Type 1—about 4 times; for Type 1A—about 2 times.

1. You can photograph obliquely through glass and water.
2. You can subdue oblique reflections which hide surface detail.
3. You can subdue bright oblique reflections which interfere with good composition.
   This oblique reflection control does not apply to metallic surfaces, unless Pola-Screens are used over both lens and lights.
4. You can darken a blue sky when photographing at right angles to the sun. In black-and-white photography with Pola-Screen Type I, this will not affect the rendering of color values of the subject photographed. The Pola-Screen Type IA is equally suitable for Kodachrome and black-and-white photography.

B. Pola-Screens (Types 1 or 1A, and 11B) at both lens and lights. Exposure increase required — 16 times and up.

1. You can copy rough prints, matte prints, damaged prints, and oil paintings which show strong reflections due to cracks, canvas texture, or brush marks.
2. You can copy any subject with the lights undiffused and quite close to the camera.
3. You can subdue the reflections in many studio subjects, whether or not these reflections are oblique.
4. You can create unusual lighting and background effects. The novelty of this subject makes it difficult to say just what application will be of most value. It is, however, a new tool, by which new effects may be achieved, and its limits are imposed only by the imagination of the user.

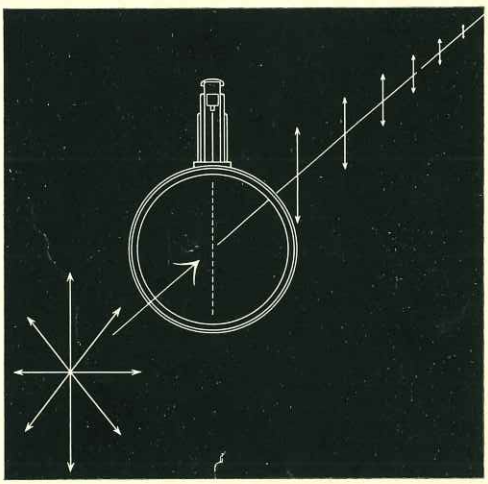


FIG. 1—*This is what happens to a ray of light when it is passed through an Eastman Pola-Screen.*

359/493

WHAT IS POLARIZED LIGHT?

Our eyes respond naturally to differences in color and intensity of light, and it is by these differences that we are able to see the world about us. There is another property in which light waves may differ, but which cannot be discerned by the unaided eye. This property is called "polarization" and is concerned with the manner in which the light ray vibrates. While the nature of light is not entirely understood, many of its effects can be explained by assuming that light is a vibratory motion which goes through space in the form of waves. Polarization is one of these effects.

The vibration of a ray of light from an ordinary source such as an incandescent lamp or the sun, is not along the direction of the ray but is at right angles to it and usually in all possible directions, see Fig. 1. It is possible to change the light ray so that only one direction of vibration is left which ray is then said to be polarized, or strictly speaking, plane polarized.

A polarizing material in sheet form is now available mounted between optical glass in the Eastman Pola-Screen. In this material there are countless minute rod-like crystals which are parallel to each other. They may be regarded as optical slits running in the direction of the handle of the mount. When the device is rotated, the direction of light vibration is rotated.

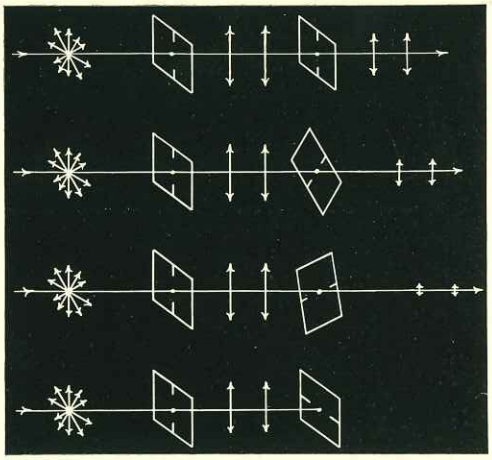


FIG. 2—*Effect of rotation of one Pola-Screen relative to another. The amount of light let through by the second Pola-Screen is cut down as the Pola-Screen is turned. When the vibration plane of the second Pola-Screen is at right angles to the first, practically no light gets through.*

When light is polarized as it will be if it has been passed through a Pola-Screen, its intensity can be controlled very definitely by passing it through a second Pola-Screen, Fig. 2. Little effect is noted if the vibration planes of the two screens are parallel. As the second screen is rotated the light is gradually eliminated until, when the two vibration planes are at right angles, almost no light passes through.

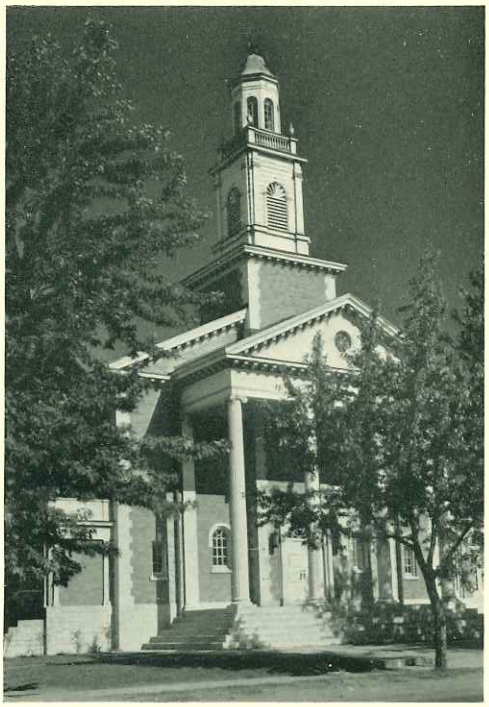
POLARIZED LIGHT AND PHOTOGRAPHY

As light which is wholly or partially polarized occurs under natural conditions, it is possible for the photographer to achieve a certain amount of brightness control by using a Pola-Screen on the camera lens. There are two sources of polarized light in nature: specular reflections from non-metallic surfaces, and light from a blue sky at right angles to the sun.

When ordinary unpolarized light strikes an object the reflected light is composed of two parts. One, the diffuse reflection, provides the light by which we see the object, while the other, the specular reflection, is that portion which gives certain objects a glare or gloss and is more or less a mirror image of the light source. The specular reflection at about 35 degrees from a flat, non-metallic surface is polarized and hence may be subdued by the use of a Pola-Screen over the lens of the camera. There will also be some effect at other angles, but none at Zero or 90 degrees.

By using a Pola-Screen, it is possible to reduce the reflection from glass or water so that detail beyond or below can be seen. Reflections may be subdued to show texture and pattern in such surfaces as grained wood, linoleum, tile, brick, painted and lacquered objects, etc. The most effective

Print from a panchromatic negative made in the usual manner. The background is blue sky.



Print from a negative made with a Pola-Screen over the lens. Values of foreground are unchanged.

camera angle is about 35 degrees to the surface. By removing surface reflections, the color of an object increases in purity for it is no longer diluted by reflected white light. This makes the Pola-Screen invaluable for color photography with the Kodachrome Film or other color processes.

Light from a clear blue sky arriving at right angles to the sun's rays is strongly polarized, as is this same sky light when it is reflected from water and other objects. Consequently, the use of a Pola-Screen gives a measure of control over the brightness of such a sky.

The sky can be darkened by means of the Pola-Screen without affecting the color rendition of objects in the foreground. This of course holds for either black-and-white or colored film, and as colored filters cannot be used with the latter, the Pola-Screen is the only method of darkening a blue sky with Kodachrome Film.

An even more extensive control over reflection can be obtained in the studio by using Pola-Screens over the illuminating lamps as well as over the camera lens. In this way the object being photographed will be illuminated with polarized light, making possible a higher degree of reflection control. Reflections from most objects or materials can be subdued to almost any degree desired. They can also be increased if the rendition of the subject matter will be improved thereby.

How To Use the Eastman Pola-Screen

Eastman Pola-Screens are supplied in three types, Type I and IA for use at the lens only, and Type IIB for use at the illuminating source. Types I and IA consist of the polarizing film, cemented between B glass, and these meet the same optical requirements as Wratten Filters in the B glass. They will not affect definition.

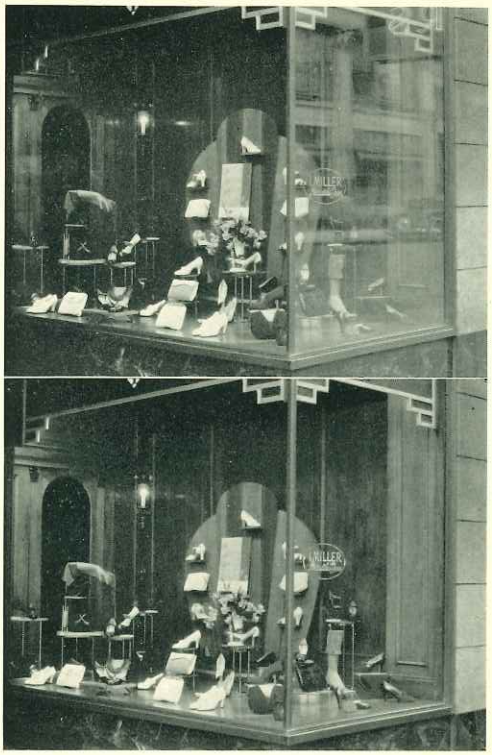
Type I, as furnished with the Lens Hood and Screen Holder for professional use, gives the most complete polarizing, and the exposure increase required is about four

times. Type IA, as supplied with the Kodak Combination Lens Attachments for hand cameras, has an exposure increase of about two times, and is recommended for most photographic work. Type IA should be used in color work as its slight density is neutral and color rendition will not be affected. Type I should not be used for color.

In using a Pola-Screen over the camera lens for reflection control, the proper position of the Pola-Screen should be determined first by viewing the subject through the Pola-Screen, rotating the latter until the desired effect is obtained. The position of the handle should then be noted and the screen fitted on to the camera lens in the same relative position. For the greatest effect in darkening a blue sky at right angles to the sun, the handle of the Pola-Screen should point directly toward or away from the sun itself. An easy way to adjust this is to turn the screen so that the shadow of the handle falls along itself.

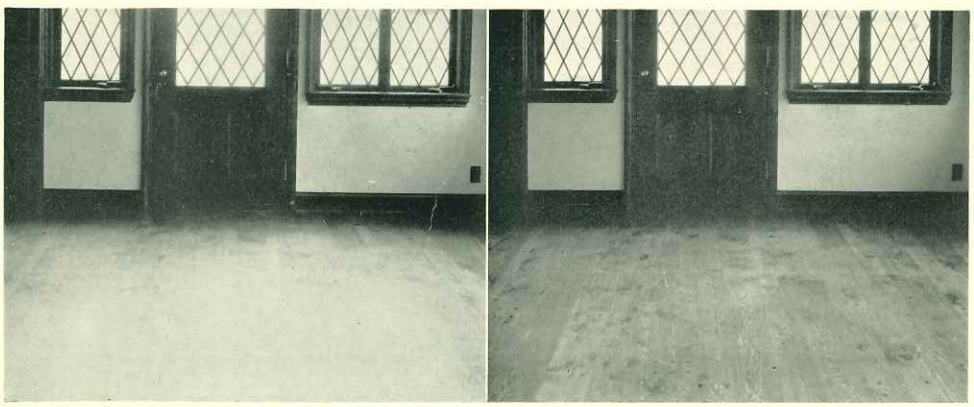
Either Type I or IA can be used in conjunction with filters for unusual effects.

The Pola-Screen Type IIB is a metal-bound 12-inch square of polarizing material. In using Pola-Screens over both lights and lens, the greatest effect is obtained when the polarizing planes are crossed. With the planes parallel, even a higher degree of reflection than normal can be obtained. Here again the effect can best be noted by viewing the subject to be photographed through the Pola-Screen from the point of view of the camera. The effect can of course be noted on the ground glass if the camera is so equipped.



Negatives made of a display window, above without; below, with Eastman Pola-Screen over lens.

This technique will be found valuable in copying and reproduction of rough surface prints, oil paintings, and other art pieces, as well as in photographing furniture, silver and glassware, wet clinical specimens, etc.

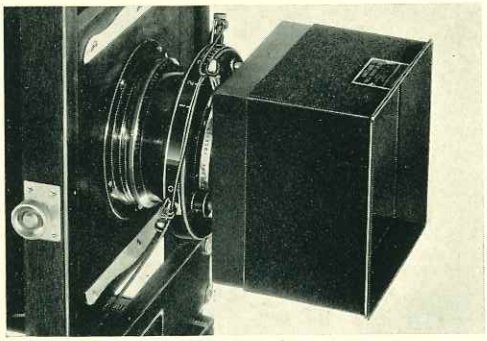


Oblique reflections from polished floor above; and at right, their removal with Eastman Pola-Screen over lens.

POLARIZING EQUIPMENT

POLA-SCREEN, TYPE I

The Lens Hood and Screen Holder is for professional use; it comes in three sizes to fit lens mounts from 1¾ to 5⅝ inches.



Lens Hood and Screen Holder for Eastman Pola-Screen Type I.

PRICE LIST

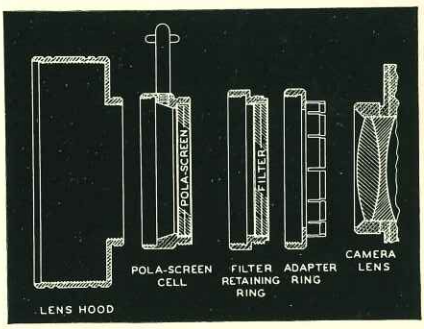
EASTMAN POLA-SCREEN TYPE I (for use at lens, not suitable for Kodachrome) in metal cell with indicator handle.

	Each
2½-inch diameter	$12.00
3½-inch diameter	18.00
4½-inch diameter	27.00
Lens Hood and Screen Holder for Eastman Pola-Screen Type I (adjustable)	
2½-inch (for lens barrel diameters 1¾ in. to 3⅛ in.)	8.00
3½-inch (for lens barrel diameters 3 in. to 4¼ in.)	9.50
4½-inch (for lens barrel diameters 4¼ in. to 5⅝ in.)	12.00
Filter Adapters for Lens Hood and Screen Holder	
For 2-inch filter in 2½-inch Lens Hood and Holder	1.00
For 3-inch filter in 3½-inch Lens Hood and Holder	1.00
For 4-inch filter in 4½-inch Lens Hood and Holder	1.00

POLA-SCREEN, TYPE IA

Kodak Combination Lens Attachments

The purpose of this new design in lens accessories is to provide any desired combination of Pola-Screens, Wratten Filters, and Lens Hood for a wide range of lens sizes. The design permits using any accessory by itself, or combined with any other, such as a Lens Hood alone, Pola-Screen with Wratten Filter, two Pola-Screens with Lens Hood, Wratten Filter with Lens Hood, etc.



Kodak Combination Lens Attachments: Lens Hood, Pola-Screen Type IA, Filter Retaining Ring, Adapter Ring which fits over camera lens.

DETAILS AND PRICES

	Series V	Series VI	Series VII	Series VIII
Kodak Pola-Screen (Type IA), with one Adapter Ring* in leather case	$11.50	$13.00	$16.00	$17.50
Kodak Lens Hood	2.25	2.75**	4.25	5.00
Wratten Filter in "B" Glass, Unmounted	1.45	1.75	2.10	2.85
Filter Sizes	1 3/16 in.	1 5/8 in.	2 in.	2 1/2 in.
Filter Retaining Ring	1.00	1.20	1.30	1.75
Adapter Rings,* Each	.75	.80	.90	1.50
Sizes of Adapter Rings	¾ in. (No. 8) 13/16 in. (No. 8A) ⅞ in. 15/16 in. (No. 3) 1 in. (No. 13) 1 1/32 in. (No. 13A) 1 1/16 in. (No. 17) 1 1/8 in. (No. 6A) 1 3/16 in. No. 18*** No. 19*** No. 21***	1¼ in. (No. 5A) 1 5/16 in. (No. 7A) 1 3/8 in. 1 13/32 in. 1 7/16 in. 1 15/32 in. (No. 22)† 1½ in. (No. 23) 1 5/8 in. 1 21/32 in. (No. 16)	1 11/16 in. 1¾ in. (No. 32) 1 13/16 in. 1⅞ in. 1 15/16 in. 2 in. (No. 33)	2 1/16 in. 2⅛ in. 2 3/16 in. 2¼ in. 2 5/16 in. 2⅜ in. (No. 34) 2 7/16 in. 2½ in.

Kodak Pola-Screen Viewer—shows effect that Pola-Screen is producing $6.00

*Order Adapter Rings by lens mount diameter or by number. If no Adapter Ring fits exactly, choose one slightly larger (to the nearest 1/32 inch) than the lens mount.

**For Kodak Bantam Special or Kodak Retina II, use Kodak Lens Hood Series VI-A ($2.75), with Series VI attachments.

***No. 18 Adapter Ring (screw-in) for Leica with Elmar *f*.3.5 lens; No. 19 Adapter Ring (screw-in) for Super Nettel with Tessar *f*.3.5 lens; No. 21 Adapter Ring (screw-in) for Kodak Retina I.

†For Super Kodak Six-20.

CINÉ-KODAK POLA-SCREEN TYPE IA MOUNTS

Pola-Screens Type IA are supplied for Ciné-Kodaks in three sizes of adjustable mounts which are attached to the lens by three variable set screws. Lens Hoods are available for each and should be used.

The Kodak Combination Lens Attachments described on the previous page may also be used on Ciné-Kodaks, by measuring the lens diameter to determine the Adapter Ring and accessories Series required.

Ciné-Kodak Pola-Screen *Type IA*	*Pola-Screen Type IA in Leather Case*	*Lens Hood*
U-10* for lens diam. ⅝ to 1⅛ in.	$8.50	Same as for 2½ and 4½ in. Ciné-Kodak Lenses $1.00
U-9* for lens diam. 1 to 1½ in.	$9.00	Same as for 6 in. Ciné-Kodak Lens $1.25
U-12* for lens diam. 1⅛ to 1⅝ in.	$15.00	Same as for 4 in. Ciné-Kodak Lens $1.50
W for 1 in. *f*.1.9 Kodak Anastigmat	$8.00†	Requires no Lens Hood

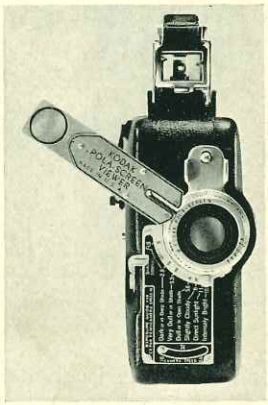
*Adjustable by Set-Screws.
†In Bakelite Case.

KODAK POLA-SCREEN VIEWER

This device serves two purposes. It enables the photographer to view subjects to determine whether a Pola-Screen can be used to advantage. When in place on the handle of a Pola-Screen Type IA, it indicates the effect the Pola-Screen is producing at the lens of either a still or motion picture camera.

PRICE

KODAK POLA-SCREEN VIEWER (for use on the handle of Pola-Screen Type IA to determine effect of screen at camera lens) . . . $ 6.00



Kodak Pola-Screen Viewer attached to a Pola-Screen Type IA in a W Mount.

Eastman Pola-Screen Type IIB, Holder, and Stand.

EASTMAN POLA-SCREEN TYPE IIB, HOLDER AND STAND

EASTMAN POLA-SCREEN TYPE IIB (for use over lights)	*Each*
Pola-Screen Type IIB (12 x 12 in.)	$22.50
Holder for Eastman Pola-Screen Type IIB	20.00
Stand to support Holder	17.50
Holder and Stand complete	35.00
Light Baffles (set of 4)	4.50

All prices subject to change without notice.

For further information regarding the use of polarized light in photography, obtain the book: "Photography by Polarized Light," published by the Eastman Kodak Company, price 50 cents.

EASTMAN KODAK COMPANY,
ROCHESTER, N. Y.

8-38-CH-25

PRINTED IN THE UNITED STATES OF AMERICA